Space Weather Forecast

Issued on Wednesday, 24 April 2024 at 12:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate flares expected (R1/R2 blackouts). Chance of isolated Minor Geomagnetic Storm intervals from peripheral coronal mass ejection (CME) effects. A fast wind from a coronal hole is likely to arrive by day 3 (26 Apr).

Solar Activity: Moderate with four Moderate flares observed, the largest observed from a active region in the southwest. There are currently fifteen sunspot regions on the Earth-facing disc. This includes a broad cluster of sunspots in the southwest, with spots magnetically connected and show some complexity, which increases the flare probabilities. Several other regions are also moderately sized, in general these remain more stable with simpler configurations.

Multiple coronal mass ejections (CMEs) observed in available imagery over the previous 24hr, although with limited clear Earth directed potential. The most likely candidates are a recent CME associated with a Moderate flare from the southwest at 22/2116UTC, perhaps bringing a glancing blow on day 4 (27 Apr). We await model output and further analysis of the CME associated with another Moderate flare from the same region at 23/1710UTC - pending analysis.

No other Earth-directed have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were slightly elevated to background throughout, on a steady trend, ending the period at around 370km/s. The Interplanetary Magnetic Field (IMF) Bt, was weak, with the important north-south component, Bz, varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Occasional Moderate flares are expected to continue, with a slight chance of isolated Strong flares. The greatest risk from the large complex of sunspot regions in the southwest.

Solar Wind / Geomagnetic Activity: There are several Coronal Mass Ejections that have been modelled and are anticipated to pass close to Earth through the period, with the potential for glancing interactions. This gives low confidence for detail of the geomagnetic forecast. Solar winds have now eased to Slow levels, and in the absence of CME influence should continue at similar levels to start the period. A further enhancement possible by day 3 (26 Apr) in association with another coronal hole currently near centre disc, likely seeing winds increasing back towards slightly elevated or elevated levels though into day 4 (27 Apr).

Overall, geomagnetic activity expected to remain mainly Quiet initially, with Unsettled intervals. However, any CME arrivals will give a chance of Active intervals and a chance of G1 Minor

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Storms, this risk peaking into day 2 (25 Apr). Activity perhaps more generally increasing by later day 3 (26 Apr) with Unsettled to Active conditions expected by the end of the period given faster solar winds.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, but with a chance of rising with any larger flares that occur. This will bring a slight chance of reaching the S1 Solar Radiation Storm levels throughout the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	25	30	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	10	10	10	10

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	20	20
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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